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Opinion Piece

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Xavatar: A Web3 Metaverse Application as a support for Patients with Mobility Disorders.

Jason P. Rothberg[1], Dr. Colin Keogh[2], Yury Rusinovich[3]

Abstract.

Xavatar is a media, educational, and therapeutic platform specializing in immersive virtual reality (VR) and augmented reality (AR) content, as well as seamless interconnectivity across various devices such as mobiles, tablets, and computers. It is aimed at improving the lives of patients with chronic mobility and communication disorders, including dementia, Alzheimer's, autism, chronic immobility, isolation, and long-term hospitalization. The project represents a fusion of digital technologies including the Metaverse, artificial intelligence (AI), and Web3, all designed to enhance healthcare interactions and patient support. This opinion piece explores the transformative potential of Xavatar, highlighting its role in shaping future healthcare landscapes through innovative, empathetic, and engaging digital solutions.

Keywords: Metaverse in Medicine, Mobility Disorders, Virtual Dance Studio, Xavatar, Virtual Reality, Augmented Reality, AI-Powered Avatars, Digital Inclusivity, Personalized Healthcare, Blockchain in Healthcare

Introduction:

YR Question 1: Please Explain the purpose of Xavatar (Figure 1)[1].

JR & CK Answer 1: Xavatar is a cutting-edge media company specializing in immersive and experiential content, with a focus on innovative outreach initiatives within the healthcare sector.

Our commitment to leveraging advanced technologies, including virtual and augmented reality, as well as seamless interconnectivity across various devices such as mobile, tablets, and computers, underscores our dedication to providing meaningful access to individuals grappling with chronic illnesses, disabilities, isolation, and conditions like Alzheimer's, Autism, Immobility issues, and long-term hospitalization.

Xavatar engages in collaborative efforts with medical practitioners, healthcare professionals, nongovernmental organizations, non-profit entities, and academic institutions to develop interactive virtual experiences tailored for the healthcare domain. Leveraging our proficient team of skilled storytellers, illustrators, web3-enabled animators, and coders, Xavatar adeptly translates the specific requirements of this sector into educational and rehabilitative aids for patients, physicians, nurses, healthcare providers, and their families.

[1] Xavatar Ltd, Killorglin, Ireland

[2] Trinity College, Dublin, Ireland

[3] ML in Health Science, Leipzig, Germany

Corresponding author: Jason P. Rothberg

Email: jason@xavatar.co

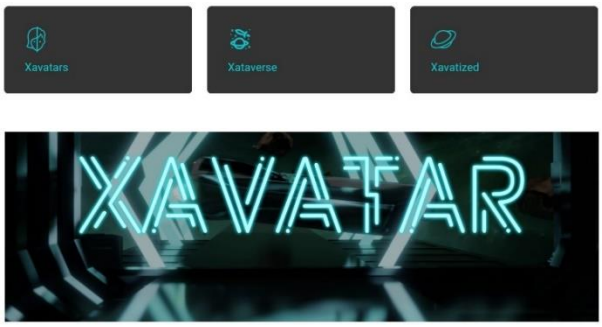

Figure 1. xavatar.co Homepage.

YR Question 2: Please provide information about similar projects, including references. Also, share what aspects of these projects you personally do not like. I personally think that your project is unique due to its use of Web3. However, please look at the information about the Metaverse for mobility disorders on the NCBI PubMed platform.

JR & CK Answer 2: Similar projects in the realm of virtual reality (VR) and augmented reality (AR) in healthcare have been pioneering various innovative applications, from enhancing empathy among healthcare professionals to aiding in rehabilitation and surgery. Here's a summary of notable projects and our personal critique on aspects that could be improved:

1. Empathy Building in Healthcare Professionals: Projects like Embodied Labs (LA US)[2] utilize interactive, 360-degree VR experiences to simulate conditions such as macular degeneration, high-frequency hearing loss, and Alzheimer's from a patient's perspective. This approach helps in building empathy among healthcare professionals by allowing them to experience the challenges their patients face. While highly effective in fostering understanding, a potential limitation is the accessibility of such technology to all healthcare professionals, especially in resource-limited settings[3].

2. Autism Communication Skills: Floreo (DC US)[4] leverages VR to teach social and communication skills to individuals with autism. By creating engaging virtual environments for practice, it offers a novel approach to therapy that differs from traditional settings. However, the reliance on VR technology might not be suitable for all individuals with autism, particularly those who are sensitive to sensory overload, highlighting the need for tailored experiences[3].

3. Physical Therapy and Rehabilitation: Platforms like InMotion's Corpus VR (Netherlands)[5] utilize gamification and VR for rehabilitating patients with physical injuries. This method makes physical therapy more engaging and can monitor patient progress through motion data. Though promising, there can be a significant upfront cost for the technology and a learning curve for both therapists and patients[3].

4. Mental Health Treatments: VR is also being used to treat mental health issues, like phobias and post-traumatic stress disorder (PTSD), by gradually exposing patients to their fears in a controlled environment. Projects like Bravemind (CA US)[6] apply VR simulations for treating PTSD in military veterans and sexual assault survivors. One critique here is the potential for VR-induced discomfort or motion sickness, which could detract from the therapeutic benefits for some users[7].

5. Improving Surgical Efficiency: Institutions like George Washington University are using VR to enhance surgical planning and training, providing surgeons with a detailed virtual exploration of the patient's anatomy before procedures. While this significantly improves surgical outcomes and training efficiency, the high cost and need for specialized equipment might limit widespread adoption[7].

6. Diminishing Pain and Enhancing Physical Therapy: Cedars-Sinai Hospital's use of VR to reduce patient pain showcases VR's potential in pain management. Additionally, VR-enabled physical therapy programs have been effective in improving motor functions in patients with conditions like cerebral palsy. However, personal critiques include the need for more extensive research on long-term outcomes and ensuring these solutions are accessible to patients across various socioeconomic backgrounds[7].

These projects demonstrate VR's vast potential in healthcare, offering innovative solutions for training, treatment, and patient care. Despite their success, challenges remain in ensuring wide accessibility, addressing individual differences in technology tolerance, and overcoming initial implementation costs.

Figure 2. Xavatar. Virtual Dance Studio: A Fun and Safe Place for Youth in Hospitals Homepage

YR Question 3: Share your thoughts here about using your technology to assist people with mobility disorders (Figure 2). P.S. In my opinion, you shouldn't focus solely on a specific age category of users. Consider expanding your audience. Believe me, there are many elderly people with mobility disorders who could benefit from your technology.

JR & CK Answer 3: Utilizing Xavatar's technology to assist individuals with mobility disorders offers a vast potential for improving quality of life, fostering independence, and enhancing rehabilitation processes. Your suggestion to not limit the application of this technology to a specific age group, especially considering the elderly population, is insightful. Mobility disorders can significantly impact an individual's ability to perform daily tasks, contribute to isolation, and reduce access to rehabilitation services, especially among the elderly. Here are several ways Xavatar's technology could be adapted and utilized:

1. Virtual Reality (VR) for Physical Rehabilitation: VR can be employed to create immersive rehabilitation programs that are both engaging and effective. By simulating real-life tasks and environments, Xavatar can provide personalized rehabilitation exercises tailored to the specific mobility challenges of each user. This approach not only aids in physical recovery but also in cognitive rehabilitation, which is particularly beneficial for the elderly who may be dealing with multiple health issues.

2. Augmented Reality (AR) for Daily Navigation and Task Completion: AR can offer real-time overlays of information to assist people with mobility disorders in navigating their environments more easily. This could include highlighting safe paths in the home or public places, providing virtual assistance for completing tasks, or offering reminders and prompts for medication and exercise. Such applications could significantly enhance the autonomy of individuals with mobility issues, including the elderly, by making everyday tasks less daunting and more manageable.

3. Social Connection and Virtual Communities: Xavatar can leverage its technology to create virtual spaces where individuals with mobility disorders can interact, share experiences, and support each other. These virtual communities can break down the barriers of isolation that many with mobility issues face, offering opportunities for social interaction, learning, and emotional support.

4. Accessible Content and Interfaces: It's crucial that the technology developed by Xavatar is designed with accessibility in mind. Interfaces should be easy to use for people with varying degrees of mobility, including those who may not be tech-savvy, such as some older adults. Voice commands, eye-tracking, or simplified touch controls can make VR and AR technologies more accessible to a broader audience.

5. Education and Awareness: Beyond direct assistance, Xavatar's immersive experiences can be used to educate family members, caregivers, and the general public about the challenges faced by individuals with mobility disorders. By fostering empathy and understanding, Xavatar can encourage a more inclusive and supportive community for those affected.

Expansion to a Broader Audience: Your point about not focusing solely on a specific age category is well-taken. Mobility issues affect individuals across all age groups, and the elderly population, in particular, stands to benefit significantly from these technologies. As the global population ages, the number of older adults with mobility disorders is expected to rise, underscoring the importance of inclusive technology solutions that cater to their needs.

By broadening its target audience to include people of all ages with mobility disorders, Xavatar could significantly impact public health and individual well-being. Collaborating with healthcare professionals, therapists, and user experience designers specializing in elderly

care could help Xavatar tailor its technologies to better serve this diverse and growing population.

Material and Methods:

YR Question 1: If I understand correctly, the main method and material of your project is Xavatar[1] (Figure 3) an animated online personification of a real human. Please explain this component in detail.

JR & CK Answer 1: Xavatar is conceptualized as an animated, AI-driven online persona that can stand in for real humans during virtual meetings on platforms like Zoom, Google Meet, Microsoft Teams, and others. It uses technologies like facial mapping, and audio recognition to mimic the real-time movements and behaviours of the person it represents. Furthermore, after a period of learning and training, it has the capability to function autonomously under human supervision and respond to voice commands from its owner. Additionally, Xavatars are unique and can be customized, existing as tokens or NFTs, adding a layer of personalization and ownership.

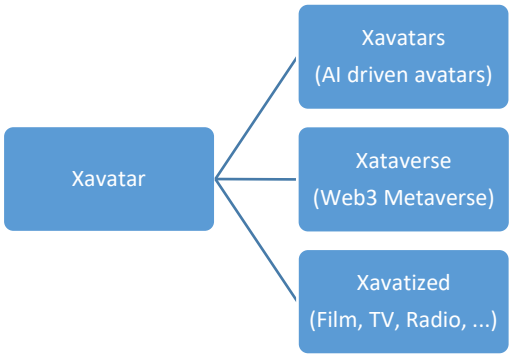

Figure 3. Xavatar components.

YR Question 2: If I understood correctly, the second main component of your platform is the Xataverse (Figure 3). This is a type of Metaverse built using Web3. You use NFTs for verification and registration of new users. Could you please provide a detailed explanation of this component?

JR & CK Answer 2: The Xataverse is designed as a comprehensive and immersive metaverse environment, utilizing Web3 technologies to offer a unique and secure user experience. Incorporating NFTs (Non-Fungible Tokens) for user verification and registration is a forward-thinking approach that leverages blockchain technology for enhanced security and user authenticity. By requiring NFT acquisition through platforms like OpenSea[8] (Figure 4), the Xataverse ensures that each user has a unique and verifiable digital identity, promoting a sense of ownership and exclusivity within the virtual world.

Figure 4. OpenSea: Animated Colin O'Donoghue NFTs by Xavatar

Here are key components and considerations for integrating such technologies into the Xataverse:

1. Accessibility Across Devices: Ensuring that users can access the Xataverse from a variety of end devices (mobile phones, tablets, laptops) is crucial for widespread adoption. This accessibility allows users to engage with the metaverse environment from their preferred devices, enhancing user convenience and experience.

2. Immersive Experience with VR and AR: The option to use virtual and augmented reality headsets for entering the Xataverse significantly enhances the immersive experience. This technology can transport users more convincingly into the virtual world, making interactions within the Xataverse feel more real and engaging.

3. Utilization of Web3 and Blockchain: The use of Web3 technologies for building the Xataverse underpins the entire ecosystem with a decentralized and secure framework. This not only ensures the security of transactions and interactions within the metaverse but also supports the unique identification of users through

NFTs. The blockchain's immutable nature offers a reliable way to verify ownership and transactions, adding a layer of trust to the virtual environment.

4. NFTs for Verification and Registration: Incorporating NFTs for user verification and registration is an innovative approach to creating a secure and exclusive community within the Xataverse. By linking each user's identity to a unique NFT, the platform can provide a verifiable digital identity for every participant, reducing the risk of fraud and impersonation, while providing additional guardrails to prevent anti-social behaviour.

5. Considerations for User Privacy and Data Security: While the use of NFTs and blockchain technology offers many advantages, it's also important to consider user privacy and data security. Ensuring that personal information is protected, while still leveraging the benefits of blockchain technology, is essential for user trust and regulatory compliance.

6. Future Directions and Potential Applications: The Xataverse could host a wide range of activities and experiences, from virtual social gatherings and gaming to educational programs and business meetings. Digital real estate and geographical twinning can also provide in depth perspectives of properties and locations to expand sales, enhance education or simply provide a fun, new locations to connect virtually. The versatility of the metaverse environment, combined with the security and uniqueness provided by Web3 and NFT technologies, opens up vast possibilities for innovation and community building.

Our project's focus on creating a secure, immersive, and accessible virtual environment aligns with the growing interest in metaverse experiences. By leveraging the latest in blockchain and VR/AR technologies, the Xataverse could offer a glimpse into the future of online interaction and digital identity.

YR Question 3: The final component of your platform is Xavatized, a film & music podcast & TV show set in the metaverse (Figure 3). Please describe this component.

JR & CK Answer 3: Xavatized, is our inhouse production facility which produces web3 enabled and XR content[9] for our own IPs as well as 3rd parties, such as film and TV studios, record labels, publishers, radio stations and beyond.

As described, serves as a multimedia content platform set within the metaverse, focusing on film, music, podcasts, and TV shows. This component represents a fusion of entertainment and technology, leveraging the immersive capabilities of the metaverse to offer unique experiences to its audience. For the Methods section of the paper, consider highlighting the following points to elucidate how Xavatized operates and its significance within the broader context of the platform:

1. Integration with the Metaverse

Virtual Venues: Highlight how Xavatized utilizes virtual spaces within the Xataverse for broadcasting its content. This includes virtual cinemas, concert halls, and studios designed to host live events, film screenings, and podcast recordings.

User Interaction and Engagement: Users can interact with the content and with each other within these virtual spaces, such as live Q&A sessions, virtual meet-and-greets with artists, and interactive audience participation in shows.

2. Content Creation and Distribution

Collaboration with Creators: Creators to contribute content to Xavatized, including any specific tools or platforms used for content creation, submission, and approval.

Distribution Channels: Content can be distributed within the Xataverse. This could involve on-demand access, scheduled broadcasts, or special event screenings, and whether content is accessible via NFT ownership or other forms of user verification.

3. Technology and Infrastructure

Streaming Technology: Xavatar utilises streaming technology and infrastructure that supports high-quality audio and video delivery within the metaverse environment, ensuring a seamless and immersive experience for users.

Blockchain and NFTs: Integration of blockchain technology and NFTs in content monetization, ownership, and distribution is also utilised. This may include exclusive content access for NFT holders or the use of blockchain for transparent royalty distribution.

4. Audience Engagement and Monetization

Monetization Models: Numerous monetization strategies for Xavatized are planned, such as subscriptions, pay-per-view events, advertising, or exclusive NFT-linked content.

Community Building and Engagement: New methods will be used to build and engage the community around Xavatized content, including social features, forums, and integration with social media platforms outside the metaverse.

5. Ethical Considerations and Content Moderation

Content Moderation: Xavatized ensures the appropriateness of content within its platform, including moderation policies and user reporting mechanisms.

Privacy and Security: Strong measures are taken to protect user privacy and data security, especially in relation to interactions within the virtual environment and transactions.

YR: Let's structure the Xavatized methods in a diagram (Figure 5).

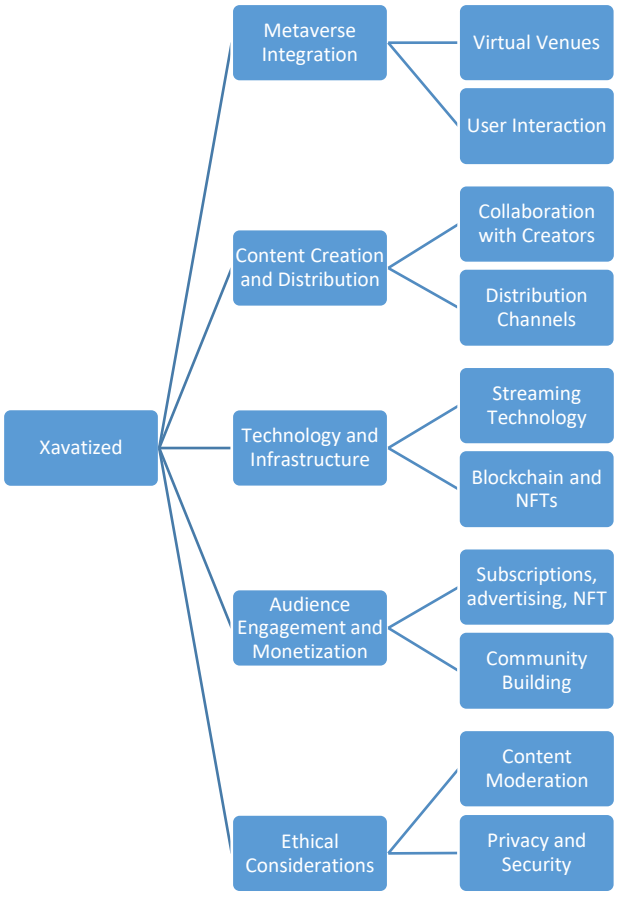

Figure 5. Xavatized Methods.

YR Question 4: Please mention any official (government, local, or international health authorities) or regulatory norms applicable to your project. Share here also how you plan to achieve adherence to the current standards in healthcare?

JR & CK Answer 4: The European Union is actively developing a regulatory framework for the metaverse, focusing on digital rights, EU laws, and preventing new private monopolies in the digital space. Key legislative acts such as the Digital Services Act[10] and Digital Markets Act[11] are instrumental in shaping these regulations, and will support the development of Xavatar. Additionally, the EU's Markets in Crypto-Assets (MiCA) Regulation[12] will regulate crypto-assets within the metaverse, ensuring a standardized approach across member states. The EU emphasizes the importance of standard setting to embody European values in the metaverse and is consulting with industry and research stakeholders to advance digital infrastructure and know-how. Xavatar will follow best practice and EU level guidance in all areas, and strive to be as compliant as possible throughout development and deployment.

For aligning with healthcare standards in the metaverse, considering the EU's regulatory direction and integrating principles from relevant healthcare guidelines and acts, such as the EU AI Act[13] and WHO AI guidelines[14], will be crucial. Ensuring data protection, ethical AI use, and adherence to digital health product standards will be key for compliance and fostering trust among users.

YR Question 5: Please provide the link to the app or interface to access Xataverse here, as I couldn't find it on your platform. If it is still not available for open access, please explain why.

JR & CK Answer 5: The Xataverse is still in development, so is as of yet not available for open access. When available it will be highlighted on the Xavatar website.

YR Question 6: What kind of analytics do you use to gather information about your clients, partners, or collaborators? And what type of information do you collect (age, gender, geographic location, type of mobility disorders, etc.)?

JR & CK Answer 6: Xavatar leverages data analytics to understand and enhance the experiences of clients, partners, and collaborators. We focus on anonymized and aggregated data to respect privacy, such as interaction patterns within the Xataverse, engagement levels with Xavatized content, and user feedback on the usability of our virtual and augmented reality interfaces. We also collect demographic information (with consent) like age, gender, and geographic location to tailor experiences and content appropriately. For users with mobility disorders, we aim to gather data on the types of disorders and usage patterns to improve accessibility and functionality of our platforms.

Reviewer's question: Does the project store patient information locally? When storing personal medical data, it's important to ensure compliance with data center requirements. Additionally, attention should be paid to server locations, as some countries require medical data to be stored within national borders. Have the authors addressed this issue?

JR & CK Answer: We've been working with IBM (NY US)[15] on solutions such as this and they have more servers in remote areas than many in the space. We will not store patient's personal medical data, but more generalised condition specific data that the users will have access too.

Reviewer's question: Is patient illness information disclosed in any public form during avatar interactions? If so, all information (audio, video, and avatar text chats) could be considered personal medical data. Depending on geography and legislation, there are requirements for the duration of this information's storage, posing potential financial risks. For example, there have been instances where successful telemedicine projects went bankrupt due to the inability to cover server costs for storing telemedicine consultation videos over extended periods.

JR & CK Answer: No. We have two test models thus far that are not modeled off actual patients. Both are created in-house with guidance from the company that funded the Alzheimer's experience, in addition to the Alzheimer's Society of Niagara. As above, we will not use patient's personal medical data, but more generalised condition specific data that the users will have access too. Specific condition experiences may be offered, but no indication that the users experience such conditions will be made available.

YR Question 7: Do you use data from user interactions and their data to improve your project? Are the users of the project informed about this?

JR & CK Answer 7: Yes, Xavatar uses data from user interactions to continually refine and enhance our projects, focusing on providing a more personalized and accessible experience. All collected data is used in compliance with privacy laws and ethical guidelines. Users are informed about the data collection practices through our privacy policy, which outlines what data is collected, how it is used, and users' rights regarding their information. Transparency and user consent are foundational to our operations, ensuring that users are always in control of their data.

YR Question 8: Do you use any form of categorization for the users of your platform based on nationality or religious status? If yes, please explain why you do it.

JR & CK Answer 8: Xavatar does not categorize users based on nationality or religious status. Our platform focuses on inclusivity and privacy, ensuring all users are treated equally without discrimination.

YR Question 9: Who assesses the stability of your project and how often? Do you regularly test it yourself, or do you invite friends or colleagues to conduct independent evaluations of your project's stability? Do you have special medical supervisors for your project?

JR & CK Answer 9: Once active, Xavatar's stability will be assessed through a combination of internal testing and external evaluations. The team will regularly conduct in-house tests to ensure the platform's robustness. Additionally, we hope to engage with a diverse group of users, including friends, colleagues, and selected participants from our user base, to provide independent feedback and identify any issues. For aspects related to healthcare, we aim consult with medical supervisors

and professionals to ensure our solutions meet the necessary standards and are effective for our target audiences. This multifaceted approach ensures continuous improvement and reliability of our project.

Results:

YR Question 1: What Technology Readiness Level (TRL) according to EU HORIZON[16,17] does your project have? Please explain your choice.

JR & CK Answer 1: Given that Xavatar is in a beta prototype phase, it would likely be positioned around Technology Readiness Level (TRL) 5 to 6. This range indicates that the technology has been validated in a relevant environment (TRL 5) and demonstrates the model or prototype in a relevant environment (TRL 6).

YR Question 2: According to my findings on OpenSea[8] your project currently boasts 26 original users, a total liquidity of 16 ETH, and 1,105 active NFTs available for trade (Figure 3). Please confirm this information and provide any additional details about the liquidity.

JR & CK Answer 2: Xavatar's first public NFT drop was based on Irish born film and TV star, Colin O'Donoghue for a podcast he hosted called The Sync Report, which Xavatar founder, Jason P. Rothberg developed and produced during the pandemic. Xavatar created 3 different animated NFTs with multiple offerings from each, one of which included original music from Suzi Quatro. These came in a range of prices and included the collectable NFT as well as various online and in person offerings. Such as a zoom meet and greet with Colin, roundtrip flights and Dublin hotel to attend a live concert in Dublin (performances by Colin O'Donoghue, Paddy Casey and Stephanie Rainey), a VIP after party, attend a private dinner party with Colin and the cast of the Podcast. This was our first case study in this market to help us better understand and perfect our NFT offerings. Although there are still NFTs from this collection available, Xavatar is no longer actively sailing these items at the moment.

YR Question 3: Were the clients satisfied with your project? How many positive feedbacks have you received? Please explain the information provided within these positive feedbacks.

JR & CK Answer 3: Xavatar has received a range of positive feedback from our clients, emphasizing the project's innovative approach to creating immersive experiences in healthcare and entertainment. Users particularly appreciate the personalized interaction through Xavatars, the inclusivity of the Xataverse, and the engaging content on Xavatized. The feedback highlights satisfaction with the platform's user-friendly design, its potential for enhancing social connections, and the practical applications in healthcare training and patient engagement. This constructive input is invaluable for guiding our ongoing improvements and expansions.

YR Question 4: How many returns or negative reactions did you receive, and what were the causes of dissatisfaction? How many clients requested a refund?

JR & CK Answer 4: None to date.

YR Question 5: As I understand from your YouTube channel[18], your partners include BeEarth Foundation (NY US)[19] and Teleton Mexico[20]. You may have others. Please provide any numerical information you can, such as their geographical distribution and affiliations.

JR & CK Answer 5: Xavatar has secured several strategic partners across multiple sectors:

1. Alzheimer Awareness Experience: We have partnered with Sandra's Home Health Care Inc. (SHHC) (Canada)[21] and the Alzheimer Society of Niagara (Canada)[22] to create an immersive and interactive experience to help demonstrate the challenges one faces once diagnosed with this disease.

2. Broadcast Deals: Xavatar has signed distribution deals with two American broadcasters for our debut animated TV series, The Xavatar Show, Ovation TV (CA US)[23] and Up TV (Georgia US)[24].

3. Production Deals: Xavatar has joined forces with Brooklyn based, virtual production leaders Planet X Studios (NY US)[25] to create 3D environments for The Xavatar Show and Xataverse. As well as one of the entertainment industry's best rated public relations firms, 42 West (Georgia US)[26] to oversee our public messaging

and top-rated casting director, Susan Lawlor of Direct-Fire Media (NY LA US)[27] to assist with securing celebrity relations from film, TV, Broadway and music sectors. AIM Productions (NY US)[28] spearheads our sponsorship, branding and product placements.

4. Fintech: Xavatar has signed an exclusive licence with banking institution and currency exchange giants, FEXCO (Ireland)[29] as the treasures for the Xataverse and working together to create our unique digital currency, the XavaToke and digital wallet.

5. Technology: Xavatar is working in partnership with IBM developing (NY US)[15] its cyber security measures as well as cloud production and computing needs. HP (CA US) is a sponsor, providing hardware to produce our TV show and live events and talk about our collaboration at last year's Cannes Film Festival (Cannes, France) in this very informative case study: How Planet X mixed realities in real-time[30].

YR Question 6: Did you need to communicate with official or unofficial authorities to register your project, pay any registration fees, cover promotion costs, manage collaborations, or secure funding?

JR & CK Answer 6: Xavatar works hand in hand with our clients to navigate all necessary registrations and sign offs by officials in various sectors. If the project is our own IP we cover all associated costs. If we develop a project in partnership with a client, we share these costs as well as marketing and promotional requirements.

As to funding, we often seek government grants to help cover research and development costs and currently seeking seed funding for Xavatar proper.

YR Question 7: Did you participate in any startup accelerators to secure funding for your project? If yes, what was your experience like?

JR & CK Answer 7: Xavatar participated in startup accelerators, which provided an invaluable platform for networking, mentorship, and securing initial funding. The experience was instrumental in refining our business model, enhancing our pitch, and gaining insights from seasoned entrepreneurs and industry experts including Alsessor at Trinity College Dublin and New Frontiers Ireland.

Discussion:

YR Question 1: Share your personal experience and satisfaction with your technology. Would you like to further promote and improve it? How do you plan to achieve this? Please discuss what you need, for example, human resources or funding, to fuel your journey.

JR & CK Answer 1: As Xavatar, we're deeply committed to further promoting and improving our technology, buoyed by the positive experiences and feedback we've received thus far. Our focus is on ensuring that Xavatar continues to serve as a pioneering platform in immersive healthcare experiences. The next steps involve solidifying our project's standing through certifications like the CE in Europe, expanding our visibility through respected publications and platforms, and securing additional resources—both human and financial. These efforts are aimed at enhancing our technology's capabilities and reach, thereby driving forward our mission to revolutionize virtual interactions in healthcare and beyond.

YR Question 2: Discuss the influence of your project on healthcare system, social life, the official industry field, or your personal environment, such as friends, relatives, etc. Consider any impact on humal wellbeing or sustainable development[31].

JR & CK Answer 2: Xavatar significantly impacts healthcare by enhancing patient engagement and education, especially for those with chronic conditions, thereby improving health outcomes. It fosters social connections by allowing people to interact in immersive, virtual spaces, reducing feelings of isolation. In the official industry, Xavatar introduces innovative approaches to training and development, with potential sustainability implications by reducing physical resource needs. Personally, it has enriched relationships with friends and relatives, offering new ways to connect and share experiences, positively influencing human wellbeing and contributing to sustainable development goals by promoting accessible and inclusive digital health solutions.

YR Question 3: Please outline the limitations of your project and how you plan to address them. From my perspective, the main current limitation of the project is that it's quite challenging to understand the workflow based on the information on your website. It's complex because you're combining Web3, AI, the Metaverse, and medicine. How would you assist users in getting started with your project?

JR & CK Answer 3: Acknowledging the complexity of integrating Web3, AI, Metaverse technologies, and healthcare into Xavatar, we see the importance of making our platform more accessible and understandable. To address this, we plan to implement a more intuitive flowchart on our website, simplifying the entry process into the Xataverse for users. This step-by-step guide will clearly outline our goals, how we achieve them, the process of becoming part of our world through NFTs, and how to enter the Metaverse, culminating in a robust feedback system to continuously refine our user experience.

Conclusion

YR Question 1: Please provide a short conclusion in which you briefly discuss the impact of your project on healthcare, social, Web3, and industry fields. Explain why your project is promising and whether it is human-centered or not.

JR & CK Answer 1: Xavatar's integration of Web3, AI, and the Metaverse within healthcare represents a pioneering shift towards more personalized, accessible, and engaging medical experiences. It promises to significantly impact healthcare by improving patient engagement, social integration for those with mobility issues, and introducing new paradigms in virtual healthcare delivery. As a human-centered technology, it emphasizes user experience, inclusivity, and the democratization of access to healthcare and social interaction, promising a more connected and empathetic digital future.

Conflict of Interest: authors state that no conflict of interest exists.

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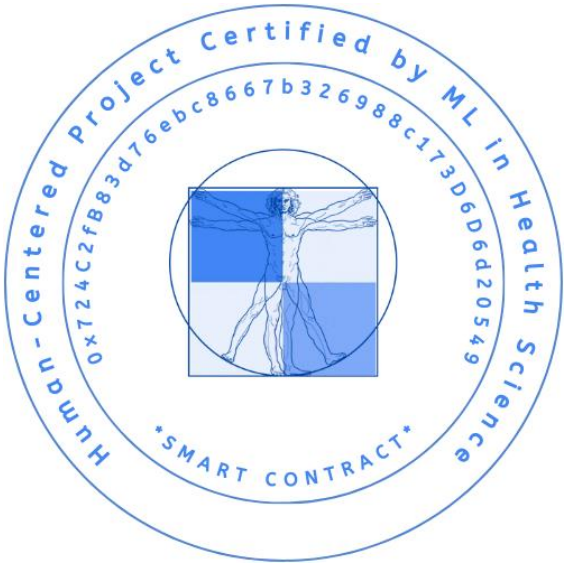
Xavatar was awarded the ML in Health Science Certificate for its Human-Centered Project:



References

1 **Xavatar. Homepage. https://xavatar.co/. Accessed April 14, 2024.**

2 **Embodied Labs. About. https://www.embodied-labs.com/about. Accessed April 20, 2024.**

3 **Gottsegen G, Urwin M. How Virtual Reality and Augmented Reality in Healthcare Is Changing Medicine. *Builtin*;2023. https://builtin.com/articles/ar-virtual-reality-healthcare. Accessed April 14, 2024.**

4 **Floreo. How it works. https://floreovr.com/how-it-works. Accessed April 20, 2024.**

5 Corpusvr. Virtual Reality in medical treatments. https://corpusvr.com/virtual-reality-treatments/. Accessed April 20, 2024.

6 Institute of Creative Technologies. Bravemind. https://ict.usc.edu/research/projects/bravemind-virtual-reality-exposure-therapy/. Accessed April 20, 2024.

7 Li D. How Virtual Reality Is Transforming Healthcare. *U.S. Chamber of Commerce*;2022. https://www.uschamber.com/technology/how-virtual-reality-is-transforming-healthcare. Accessed April 14, 2024.

8 Xavatar. OpenSea: Animated Colin O'Donoghue NFTs by Xavatar. https://opensea.io/collection/colinodonoghue. Accessed April 14, 2024.

9 Wikipedia. Extended reality. https://en.wikipedia.org/wiki/Extended_reality. Accessed April 14, 2024.

10 European Parliament. Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC (Digital Services Act) (Text with EEA relevance). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32022R2065. Accessed April 14, 2024.

11 European Parliament. Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on contestable and fair markets in the digital sector and amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act) (Text with EEA relevance). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32022R1925. Accessed April 14, 2024.

12 European Parliament. Regulation (EU) 2023/1114 of the European Parliament and of the Council of 31 May 2023 on markets in crypto-assets, and amending Regulations (EU) No 1093/2010 and (EU) No 1095/2010 and Directives 2013/36/EU and (EU) 2019/1937 (Text with EEA relevance). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32023R1114&pk_campaign=todays_OJ&pk_source=EURLEX&pk_medium=TW&pk_keyword=Crypto%20assets&pk_content=Regulation&pk_cid=EURLEX_todaysOJ. Accessed April 14, 2024.

13 European Parliament. Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL LAYING DOWN HARMONISED RULES ON ARTIFICIAL INTELLIGENCE (ARTIFICIAL INTELLIGENCE ACT) AND AMENDING CERTAIN UNION LEGISLATIVE ACTS. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52021PC0206. Accessed April 14, 2024.

14 World Health Organization. Ethics and governance of artificial intelligence for health: Guidance on large multi-modal models. https://www.who.int/publications/i/item/9789240084759. Accessed April 14, 2024.

15 IBM. Products. https://www.ibm.com/products. Accessed April 21, 2024.

16 Wikipedia. Technology readiness level. https://en.wikipedia.org/wiki/Technology_readiness_level. Accessed April 14, 2024.

17 EU HORIZON 2020 – WORK PROGRAMME 2014-2015. Technology readiness levels (TRL); Extract from Part 19 - Commission Decision C(2014)4995. https://ec.europa.eu/research/participants/data/ref/h2020/wp/2014_2015/annexes/h2020-wp1415-annex-g-trl_en.pdf. Accessed April 20, 2024.

18 Xavatar. YouTube Channel. https://www.youtube.com/@Xavatar. Accessed April 14, 2024.

19 Be Earth Foundation. About. https://beearthfoundation.org/foundational-impact/. Accessed April 20, 2024.

20 Fundación Teletón - Teletón México. Información. https://teleton.org/notas/informacion/. Accessed April 20, 2024.

21 Sandra's Home Health Care. About. https://www.shhcniagara.com/about. Accessed April 20, 2024.

22 Alzheimer Society of Niagara. About us. https://alzheimer.ca/niagara/en/about-us. Accessed April 20, 2024.

23 Ovation TV. About. https://www.ovationtv.com/about/. Accessed April 20, 2024.

24 UPTV. WHAT IS UPTV? https://uptv.com/about/. Accessed April 20, 2024.

25 Planet X Studios. Studios. https://www.planetxstudios.life/studios. Accessed April 20, 2024.

26 42 West. Our Mission. https://42westentertainmentgroup.com/about. Accessed April 20, 2024.

27 Directfiremedia. About. https://directfiremedia.com/. Accessed April 21, 2024.

28 AIM Productions. About us. https://www.aimproductionsinc.com/aboutus.html. Accessed April 21, 2024.

29 fexco. About. https://www.fexco.com/fexco/about-fexco/corporate-information/. Accessed April 21, 2024.

30 BroadcastTech. HP Case Study: How Planet X mixed realities in real-time. https://www.broadcastnow.co.uk/tech/hp-case-study-how-planet-x-mixed-realities-in-real-time/5190134.article. Accessed April 14, 2024.

31 United Nations. THE 17 GOALS. https://sdgs.un.org/goals. Accessed April 14, 2024.